

CLAIMS

1. A method for positioning a patient comprising:
determining reference positions for a plurality of body locations on a patient;
manipulating one or more of the plurality of body locations of the patient so that
5 the relative positions between the plurality of body locations corresponds to the relative
positions between the reference positions; and
maneuvering the patient so that the absolute positions for the plurality of body
locations corresponds to the absolute positions for the reference positions.
- 10 2. The method of claim 1 in which the act of determining reference positions
comprises:
placing a plurality of markers on the plurality of body locations;
detecting the plurality of markers; and
determining coordinates for the plurality of markers.
- 15 3. The method of claim 2 in which one or more cameras are used to detect the
plurality of markers.
- 20 4. The method of claim 3 in which the one or more cameras comprise one or more
CCD cameras.
5. The method of claim 2 in which the plurality of markers comprise retro-reflective
markers.
- 25 6. The method of claim 2 further comprising directing an infrared light source at the
patient and in which the act of detecting the plurality of markers comprise the detection of
reflected infrared light from the plurality of markers.
- 30 7. The method of claim 2 in which the plurality of markers comprise one or more
marker blocks comprising one or more reference elements.
8. The method of claim 1 in which the maneuvering of the patient is performed by a
computer-controlled patient support structure.

9. The method of claim 1 further comprising:
determining a position of an internal body structure within the patient.

5 10. The method of claim 9 further comprising:
performing adjustments to the patient to position the internal body structure.

11. The method of claim 9 in which the act of determining is performed by a medical
imaging device.

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12. A system for positioning a patient comprising:
a plurality of markers located at particular body locations on the patient;
one or more marker detection apparatuses, each of the one or more marker
detection apparatuses configured to output information indicative of the positions of the
plurality of markers;

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a computing device to receive the output information from the plurality of marker
detection apparatuses, the computing device having a processor configured to determine
the location of the plurality of markers; and

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a patient support structure upon which the patient is supported, the patient support
structure movably configured to reposition the patient upon instructions sent by the
computing device.

13. The system of claim 12 in which the plurality of markers comprise retro-reflective
markers.

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14. The system of claim 12 in which the plurality of markers comprise marker blocks,
each of the marker blocks comprising one or more retro-reflective elements.

15. The system of claim 12 in which the one or more marker detection apparatuses
comprise one or more cameras.

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16. The system of claims 15 in which the one or more cameras comprise CCD
cameras.

17. The system of claim 15 in which each of the one or more cameras is co-located with a light source.

5 18. The system of claim 17 in which the light source comprises an infrared light source.

19. The system of claim 15 in which a video image of the patient is displayed on a video display device.

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20. The system of claim 19 in which the video image comprises images of the plurality of markers.

15 21. A system for measuring the position of a patient comprising:
a plurality of markers located at particular body locations;
one or more cameras, each of the one or more cameras comprising a lens,
a light source co-located with the one or more cameras; and
a computing device to receive output information from one or more cameras, the
computing device having a processor configured to determine the location of the plurality
20 of markers.

22. The system of claim 21 in which the light source is an infrared light source.

25 23. The system of claim 21 in which a video image of a patient is displayed on a video display device.

24. The system of claim 23 in which the video image comprises real-time images of the plurality of markers.

30 25. The system of claim 23 in which the video image comprises images of reference positions for the plurality of markers.

26. The system of claim 23 in which the video image comprises a real-time image of the patient.

27. The system of claim 23 in which the video image comprises an image of a reference position for the patient.

28. A retro-reflective marker for use in a patient treatment system comprising:
a raised reflective surface; and
a flat surface located at the base of the raised reflective surface.

29. The retro-reflective marker of claim 28 in which the raised reflective surface comprises a hemispherical shape.

30. A marker block for use in a patient treatment system comprising:
a surface area;
a first reference location on the surface area;
a second reference location on the surface area; and
the first reference location and the second reference location positioned on the surface area such that both reference locations are simultaneously detectable by an optical imaging apparatus.

31. The marker block of claim 30 in which the first and second reference locations comprise retro-reflective material.

32. The marker block of claim 30 comprising a shape that matches a patient body location.

33. A system for detecting a marker block in a patient treatment system comprising:
an optical imaging apparatus;
a marker block having a surface;
one or more reflective elements located on said surface; and
said marker block positioned to reflect light from said one or more reflective elements to said optical imaging apparatus.

34. The system of claim 33 in which said reflective elements are retro-reflective elements.

5 35. The system of claim 33 in which said marker block is shaped to fit a specific body location.

36. A method for patient positioning comprising:
determining reference positions for a plurality of body locations;
10 determining actual locations for the plurality of body locations;
calculating posture errors based upon a comparison of the reference locations and
the actual locations for the plurality of body positions; and
providing instruction to correct the posture errors.

15 37. The method of claim 36 further in which the instructions are visual instructions comprising pictorial movement guidance.